

**Coluccio, Tina (DNRE)**

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**From:** Casey, Steve (DNRE)  
**Sent:** Tuesday, January 18, 2011 9:31 AM  
**To:** Coluccio, Tina (DNRE); Conroy, Randy (DNRE)  
**Subject:** FW: Effluent Limits Only Request  
**Attachments:** Final ELO Request Jan12 2011.pdf

Kennecott Humboldt Mill NPDES file

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**From:** Mariuzza, Kristen (TI) [mailto:Kristen.Mariuzza@riotinto.com]  
**Sent:** Wednesday, January 12, 2011 5:27 PM  
**To:** Bitondo, Mike (DNRE)  
**Cc:** Casey, Steve (DNRE)  
**Subject:** Effluent Limits Only Request

Mr. Mike Bitondo,

I am sending this request to you because I was informed that you are the Acting Chief since Jerry Saalfeld retired. However, the attached letter was finalized and a hard copy mailed prior to my finding that out. Therefore, I apologize that the letter is not addressed to you, but to Mr. Saalfeld.

Kennecott Eagle Minerals Company (KEMC) is investigating the possibility of an alternative crushing/grinding operation at the Humboldt Mill facility located in Champion, Michigan (Permit No. MI0058649). In order to proceed with this evaluation and determine feasibility, all changes (if any) to the currently permitted effluent limits must be considered. Attached is a detailed formal effluent limits only request identifying the alternative process being considered, an explanation of the process and any associated changes. Please note that the alternate process does not change the water quality, quantity or discharge location of the currently permitted discharge. A hard copy has been mailed directly to your office.

Thank you for considering this request, and if you have any questions, please do not hesitate to contact me.

Sincerely,

Kristen Mariuzza

Kristen Mariuzza, P.E.  
Environmental & Permitting Manager  
Technology & Innovation – Eagle Project

Rio Tinto  
504 Spruce Street, Ishpeming, MI 49849, USA

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1/18/2011

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Mr. Gerald W. Saalfeld, Chief  
 Lakes Michigan and Superior Permits Unit  
 Permits Section  
 Water Resources Division  
 Michigan Department of Natural Resources and Environment ("Department")  
 P.O. Box 30273  
 Lansing, MI 48909-7773  
 January 12, 2011

**Subject:** Kennecott Eagle Minerals Company, Humboldt Mill Facility, 4547 County Road 601, Champion, Michigan: Effluent Limits Only Request

Dear Mr. Saalfeld:

Kennecott Eagle Minerals Company ("Kennecott") is currently evaluating the feasibility of modifying the ore beneficiation process that is currently permitted for the Humboldt Mill Facility in Champion, Michigan. Although the process modification would not change the quantity or quality of water that is currently permitted to be discharged, an accurate evaluation is critical in determining the feasibility of this alternative. Therefore, Kennecott is submitting an Effluent Limits Only Request to consider the changes, if any, to the NPDES permit.

The alternative process modifies the grinding portion of the operation and would allow beneficiation of copper and nickel ore in a manner that is safer, more efficient and with lesser overall emissions to the environment. Although this process design change would include an increase in the ore throughputs at the mill, as stated previously, there will be no additional pollutant loading to surface water or water discharged. Following is a description of the currently permitted process as identified in the existing NPDES permit application and a subsequent description of the alternative process being evaluated.

#### EXISTING PERMIT

Discharge of a maximum of 0.82 million gallons per day ("MGD") of treated process wastewater from the Humboldt Mill facility to a wetland contiguous to the Middle Branch of the Escanaba River is currently authorized by NPDES permit number MI0058649, issued to Kennecott on February 9, 2010. The existing surface water discharge permit was issued by the Department in response to an application submitted to the Department on December 30, 2008 and related correspondence.

As noted in the permit application and correspondence, the permitted discharge was based on a mill redevelopment plan including reuse of certain operations and facilities at the mill and upgrade of others. Specifically, the permit was based on reuse of the following existing equipment: (1) mill building; (2) ore/feed conveyor

In addition, the permitted discharge was based on replacement or upgrade of the flotation cells, thickeners, piping to convey tailings from the mill to the Humboldt Tailings Disposal Facility ("HTDF"), and the process water intake at the HTDF to convey water to the mill. Equipment is to be upgraded and replaced where existing equipment is in a state of disrepair and cannot practically be reused. In each instance, upgraded or replacement equipment is to be installed in the same general location and serve the same purpose as existing equipment.

The permitted surface water discharge includes the following major sources of water:

- Net precipitation (i.e., precipitation less evaporation) from the HTDF and portions of the facility that drain to the HTDF (0.51 MGD);
- Groundwater that infiltrates into the HTDF and flows through to the NPDES outfall (0.06 MGD);
- Water displaced from the HTDF as a result of subaqueous placement of tailings from the *ore processing operation* (0.10 MGD); and
- Net treated process wastewater derived from the froth flotation metallic concentrate production process (i.e., 0.22 MGD of process wastewater discharged from the mill to the HTDF, less 0.17 MGD of water recycled from the HTDF to the mill, resulting in a net discharge of process wastewater from the HTDF to surface water of 0.05 MGD).

Water balance diagrams for the permitted facility were presented as Figures 3-2 and 3-3 of the original NPDES permit application files and are included as Attachment I to this letter. As noted above and indicated on Figures 3-2 and 3-3, 0.17 MGD (approximately 75%) of the 0.22 MGD of process wastewater discharged from the mill to the HTDF will be recycled to the mill. A conceptual process flow diagram for the permitted beneficiation process is presented as Attachment II to this letter.

## PROCESS MODIFICATIONS UNDER CONSIDERATION

Kennecott is evaluating the following modifications to the beneficiation process design at the Humboldt Mill facility:

- Particle size reduction of copper and nickel ore may be accomplished using a combination of primary crushing and a new semi-autogeneous grinding ("SAG") mill, rather than through the primary, secondary and tertiary crushing operations that are part of the currently permitted process.
- The nominal throughput of the beneficiation process is planned to be increased from 1,500 tonnes per day to 2,000 tonnes per day; and
- Ore crushing, grinding and froth flotation operations, including flotation cells and thickeners, may be housed in a new building to be constructed on the Humboldt Mill property, rather than in the existing mill building.

A SAG mill is a rotating cylindrical device that grinds ore by tumbling the ore with a relatively small quantity of steel balls and water. The mill is constructed of lined steel and equipped with lifters on the interior of the drum, which assist in raising the mill contents as the mill rotates. Ore is fed from the primary crusher to the SAG mill feed chute and is removed from the SAG mill when it is small enough to pass through discharge grates. Rotation of the SAG mill containing the steel balls, ore and water

for a designated residence time at a designated speed causes the ore to be ground. The SAG mill would be used in lieu of secondary and tertiary crushing operations, thereby simplifying the crushing process and reducing the need for transfer of partially crushed ore, which in turn, results in an overall reduction of air emissions.

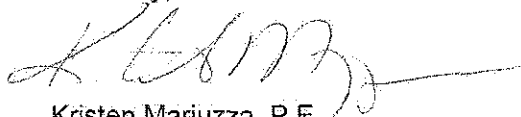
The current NPDES application indicates that flotation cells and thickeners would be constructed in the existing mill building in the same general location where flotation cells and thickeners were previously located. However, due to the environmental, financial, and safety benefits, the alternative being evaluated includes a new mill building to house both the SAG mill and the froth flotation concentrate production process. Housing the process equipment in a common building with the SAG mill would enhance process efficiency and result in a safer, more environmentally sound beneficiation operation. To the extent practical, reuse of existing equipment and facilities at the site would remain a significant goal of Kennecott's site redevelopment process.

Water balance diagrams for the revised beneficiation process are presented as Attachment III to this letter. As evident from review of these water balance diagrams, the major contributors to the surface water discharge remain the same: (a) 0.51 MGD of net precipitation; (b) 0.06 MGD of groundwater that infiltrates the HTDF; (c) 0.09 MGD of water displaced from the HTDF as a result of placement of tailings; and (d) 0.06 MGD of net water discharge from the mill operation (i.e., 0.24 MGD of wastewater discharged from the mill to the HTDF, less 0.18 MGD of water recycled from the HTDF to the mill). Consistent with the currently permitted process, the revised process would call for approximately 75% of the wastewater discharge from mill to the HTDF to be recycled from the HTDF for reuse in the milling process. As evident from comparison of the water balance diagrams for the permitted and the revised processes, the proposed increase in mill throughput would not change the volume of water discharged to surface water from the HTDF as a result of Kennecott's operations at the site. A conceptual process flow diagram for the revised process is presented as Attachment IV to this letter.

As noted previously, the process design changes being considered alter the grinding aspect of the existing process and are not anticipated to change the permitted water discharge. The permitted pollutant loading, water discharge rate, facility operations, outfall location and overall water quality will not be affected by the proposed changes.

We appreciate your time and consideration of this request and we look forward to your response. If you have questions or need additional information, please do not hesitate to contact me at 906.486.1257.

Sincerely,



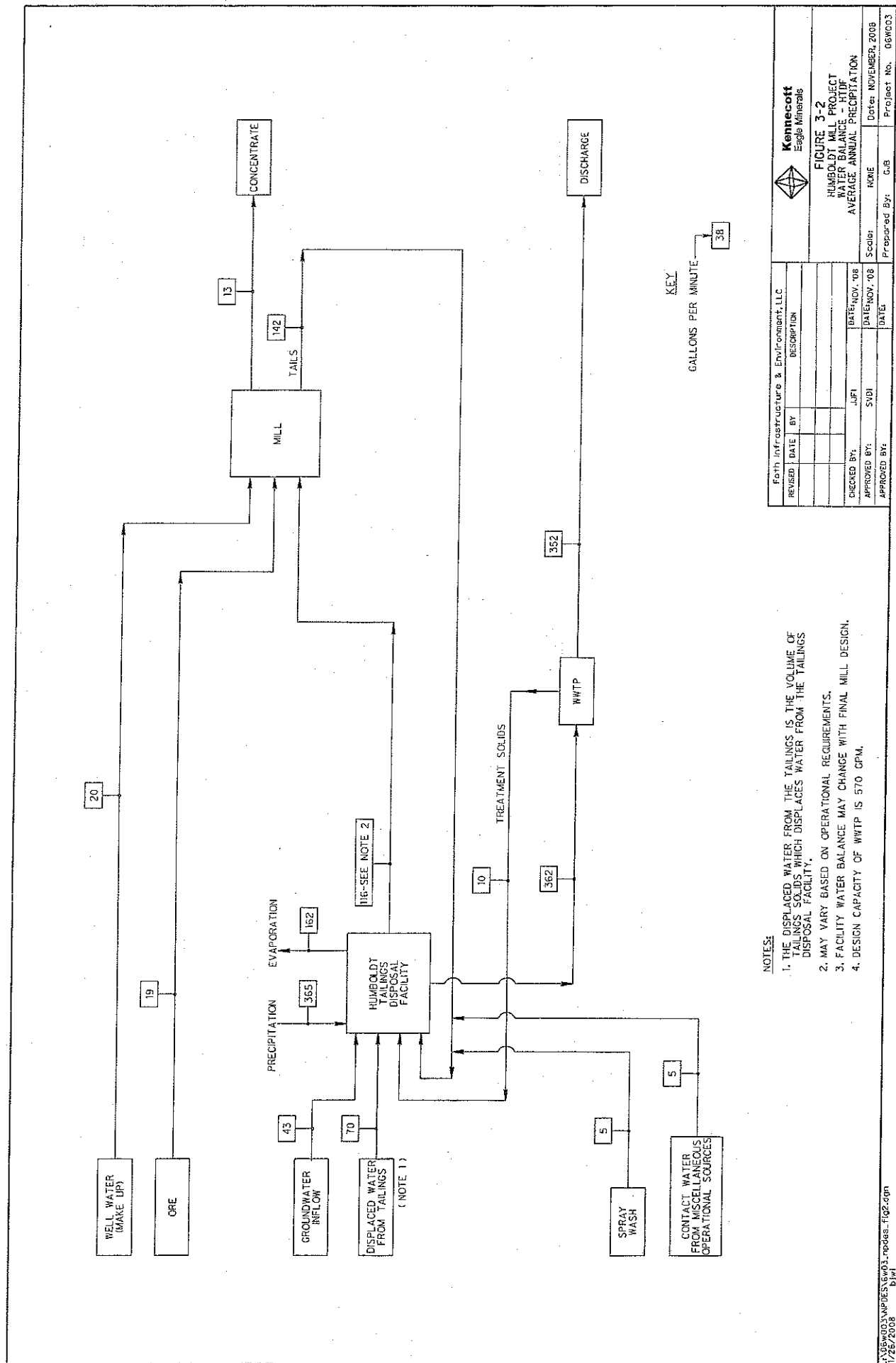
Kristen Mariuzza, P.E.  
Environmental & Permitting Manager

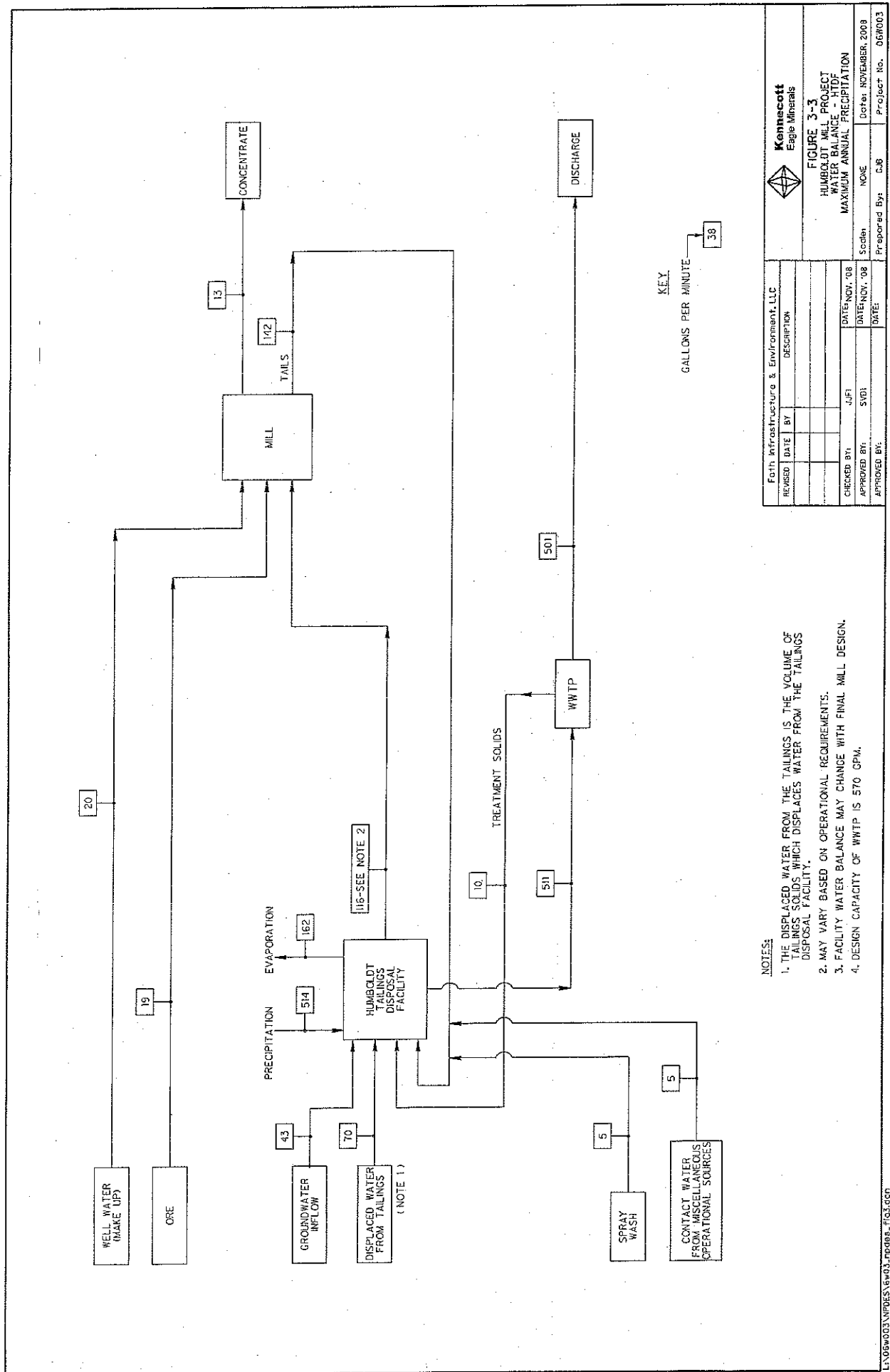
enclosures

*ATTACHMENT I*

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*HUMBOLDT MILL FACILITY  
SUMMARY WATER BALANCE DIAGRAMS FOR  
PERMITTED OPERATIONS*





Fath Infrastructure & Environment, LLC		Kennecott Eagle Minerals	
REVISION	DATE	BY	DESCRIPTION
CHECKED BY:	JJF	DATE:	NOV. '08
APPROVED BY:	SYD	DATE:	NOV. '08
APPROVED BY:		DATE:	
Scale:		None	Scale: NOVEMBER, 2008
Prepared By:		CJB	Project No. 06R003

**FIGURE 3-3**  
**HUMBOLDT MILL PROJECT**  
**WATER BALANCE - HTDF**  
**MAXIMUM ANNUAL PRECIPITATION**

***ATTACHMENT II***

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***HUMBOLDT MILL FACILITY  
CONCEPTUAL PROCESS FLOW DIAGRAM  
FOR PERMITTED OPERATIONS***

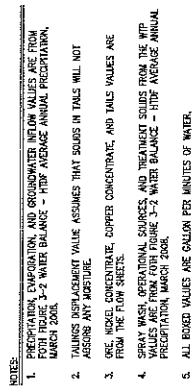




***ATTACHMENT III***

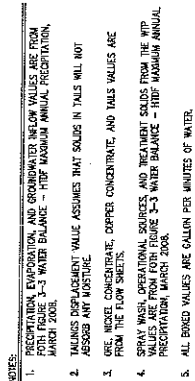
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***HUMBOLDT MILL FACILITY  
SUMMARY WATER BALANCE DIAGRAMS FOR  
MODIFIED PROCESSING OPERATIONS***



**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

[illegible]



W3M NOTE 5

**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

[illegible]

*ATTACHMENT IV*

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*HUMBOLDT MILL FACILITY  
CONCEPTUAL PROCESS FLOW DIAGRAM  
FOR MODIFIED PROCESSING OPERATIONS*

